

Technical Report
Defense University Instrumentation Research Program

Grant Number F49620-00-1-0264

Test Equipment for a W-band Microwave Source

Sponsored by
Air Force Office of Scientific Research/NE

Program Manager
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Final Technical Report

The equipment purchased with the 2000 DURIP contract # F49620-00-1-0264 is listed below.

Equipment and Vendor	Cost
Millimeter Wave Vector Network Analyzer Agilent Technologies	\$130,882
Millimeter wave waveguide components Millitech Inc.	\$2,676
Positioning stages and optical components Newport Corporation	\$53,254

The above items total cost is \$186,812. The difference between this and the grant amount of \$200,000 has been returned to AFOSR.

The Agilent Millimeter Wave Vector Network Analyzer is being used to cold test the LIGA fabricated RF circuits and components used in the 94 GHz Klystrino program funded by the 1999 MURI on Innovative Vacuum Electronics. The vector network analyzer, together with some inhouse fabricated coaxial probes, is used to determine frequency, external Q and circuit losses in the LIGA cavities of the klystrino. The small physical dimensions of these cavities and coupling irises make the measurement process very difficult. Prior to the acquisition of the vector network analyzer, standalone electronic equipment was combined to provide similar measurement capabilities but its measurement accuracy was questionable and the data acquisition process required orders of magnitude more time for an equivalent measurement. The small feature size of the resonant cavities in the klystrino led to severe difficulties with a hand manipulated measurement setup. In order to accurately position and translate the measurement probes, several linear translation stages were used to provide computer control of the position and linear motion of the millimeter wave coaxial probes. The translation stages as well as some optical equipment to provide closeup viewing of the circuit and probes were purchased from Newport Corporation.

The final equipment purchase made in connection with the MURI funded klystrino program consisted of several pieces of millimeter wave waveguide components from Millitech Inc. These components are used to provide coupling to the RF circuit and to couple a portion of the signal to diagnostic equipment.

Appended to this document is a photograph of the DURIP funded equipment showing the vector network analyzer and the Newport positioning stages and optical workbench. Stanford University sincerely appreciates the funding provided by the DURIP program as it will significantly improve the testing and subsequent design modifications for the 94 GHz Klystrino program.

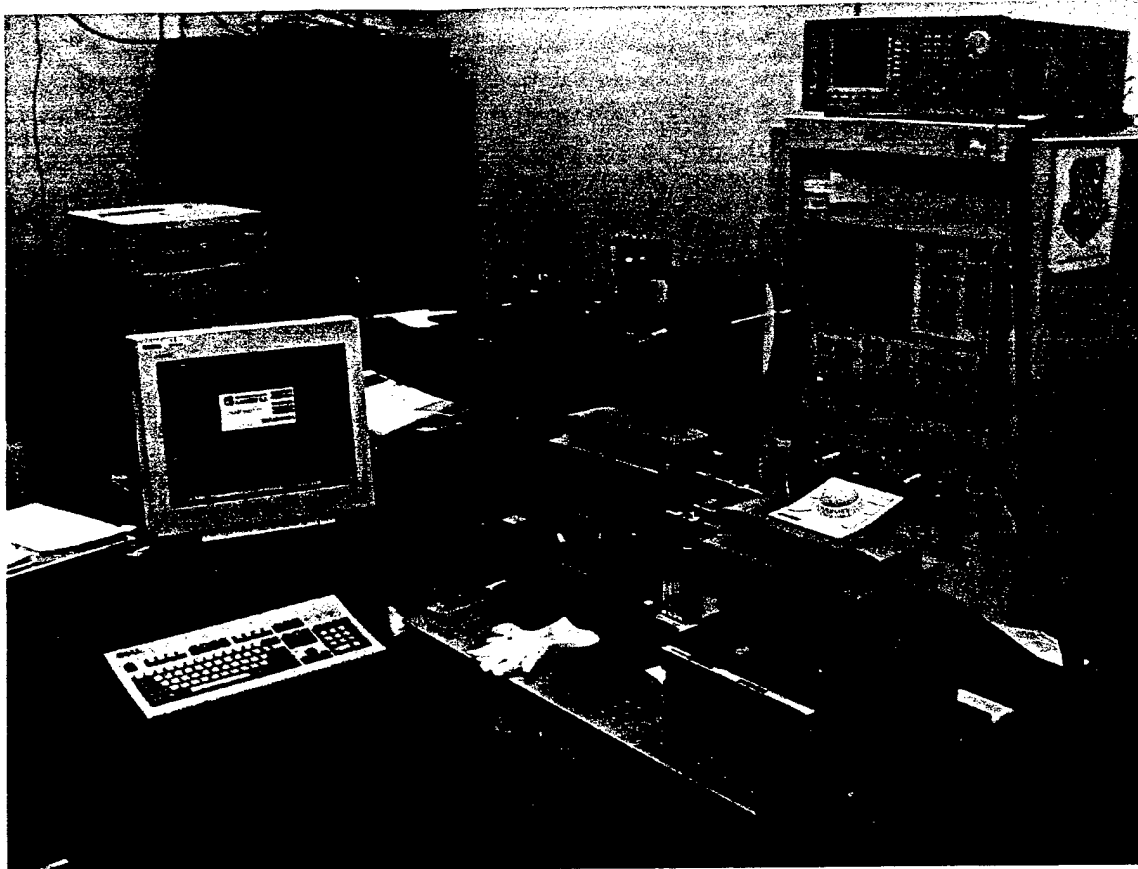


Figure 1 Photograph of Agilent Millimeter Wave Vector Network Analyzer and the Newport linear positioning stages and optical workbench.

Sincerely,

Glenn Scheitrum

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REPORT DOCUMENTATION PAGE

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12a. DISTRIBUTION AVAILABILITY STATEMENT APPROVAL FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED				12b. DISTRIBUTION CODE AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFOSR) NOTICE OF TRANSMITTAL DTIC. THIS TECHNICAL REPORT HAS BEEN REVIEWED AND IS APPROVED FOR PUBLIC RELEASE LAW AFR 100-12. DISTRIBUTION IS UNLIMITED.	
13. ABSTRACT (Maximum 200 words) The funds from this equipment grant were used to purchase the following: one (1) Agilent Technologies Millimeter Wave Vector Network Analyzer (\$130,882), assorted Millitech Inc. millimeter wave waveguide components (\$2,676), and assorted Newport Corp. positioning stages and optical components (\$53,254). The unexpended balance of \$13,188 is being returned to the government. All of the above equipment is being directly applied to accelerate research progress on the 94 GHz "klystrino" concept being studied under the FY99 Vacuum Electronics MURI.					
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